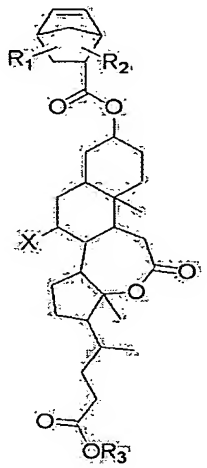
[0090] WHAT IS CLAIMED IS:

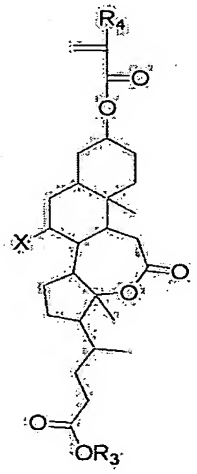
1. A norbornene monomer represented by Formula (I):



(I)

wherein R_1, R_2 and R_4 are each independently hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy or phenyl; R_3 is hydrogen, C_{1-20} alkyl, C_{1-20} alkoxy, phenyl, C_{1-20} hydroxyalkyl, C_{1-20} alkoxyalkyl, C_{6-30} alicyclic hydrocarbon or C_{6-30} aliphatic lactone; and X is hydrogen or hydroxyl.

2. An acrylate or methacrylate monomer represented by Formula (II):

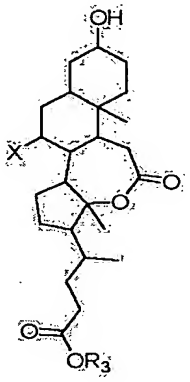


(II)

wherein R_1, R_2 and R_4 are each independently hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy or phenyl; R_3 is hydrogen, C_{1-20} alkyl, C_{1-20} alkoxy, phenyl, C_{1-20}

hydroxyalkyl, C_{1-20} alkoxyalkyl, C_{6-30} alicyclic hydrocarbon or C_{6-30} aliphatic lactone; and X is hydrogen or hydroxyl.

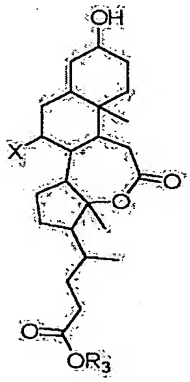
3. An alcoholic compound represented by Formula (III):



(III)

wherein R_3 is hydrogen, C_{1-20} alkyl, C_{1-20} alkoxy, phenyl, C_{1-20} hydroxyalkyl, C_{1-20} alkoxyalkyl, C_{6-30} alicyclic hydrocarbon or C_{6-30} aliphatic lactone; and X is hydrogen or hydroxyl.

4. A method of preparing the monomer of Formula (I) as defined in claim 1 by reacting the alcoholic compound represented by Formula (III):

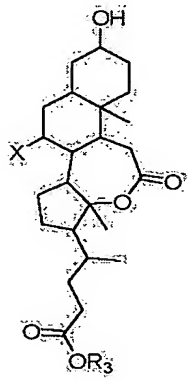


(III)

wherein R_3 is hydrogen, C_{1-20} alkyl, C_{1-20} alkoxy, phenyl, C_{1-20} hydroxyalkyl, C_{1-20} alkoxyalkyl, C_{6-30} alicyclic hydrocarbon or C_{6-30} aliphatic lactone; and X is hydrogen or hydroxyl,

with a compound selected from 2-chlorocarbonyl-5-norbornene, acryloyl chloride and methacryloyl chloride.

5. A method of preparing the monomer of Formula (II) as defined in claim 2 by reacting the alcoholic compound represented by Formula (III):

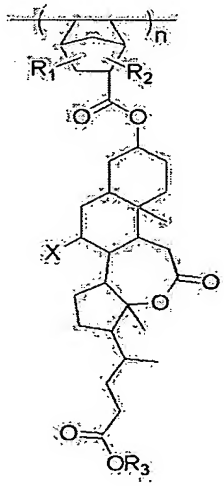


(III)

wherein R_3 is hydrogen, $C_{1\text{-}20}$ alkyl, $C_{1\text{-}20}$ alkoxy, phenyl, $C_{1\text{-}20}$ hydroxyalkyl, $C_{1\text{-}20}$ alkoxyalkyl, $C_{6\text{-}30}$ alicyclic hydrocarbon or $C_{6\text{-}30}$ aliphatic lactone; and X is hydrogen or hydroxyl,

with a compound selected from 2-chlorocarbonyl-5-norbornene, acryloyl chloride and methacryloyl chloride.

6. A polymer represented by Formula (IV):

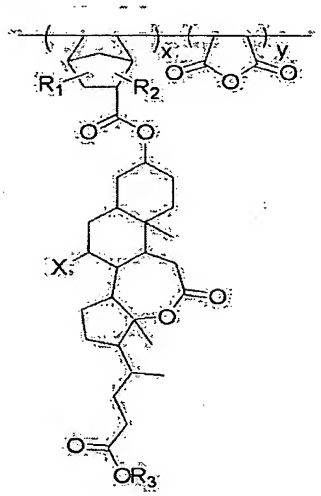


(IV)

wherein R_1, R_2 and R_4 are each independently hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy or phenyl; R_3 is hydrogen, C_{1-20} alkyl, C_{1-20} alkoxy, phenyl, C_{1-20} hydroxyalkyl, C_{1-20} alkoxyalkyl, C_{6-30} alicyclic hydrocarbon or C_{6-30} aliphatic lactone; X is hydrogen or a hydroxyl; and n represents the degree of polymerization and is an integer from 1 to 1000.

7. A photoresist composition comprising the polymer of Formula (IV) in claim 6, and a photoacid generator.

8. A polymer represented by Formula (V):

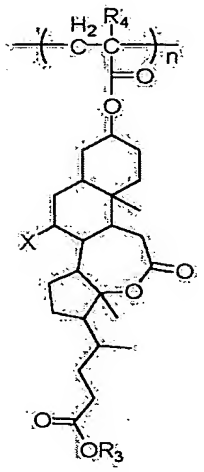


(V)

wherein R_1, R_2 and R_4 are each independently hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy or phenyl; R_3 is hydrogen, C_{1-20} alkyl, C_{1-20} alkoxy, phenyl, C_{1-20} hydroxyalkyl, C_{1-20} alkoxyalkyl, C_{6-30} alicyclic hydrocarbon or C_{6-30} aliphatic lactone; X is hydrogen or hydroxyl; and x and y each represents a molar ratio of each monomer unit and the sum x + y is 1.

9. A photoresist composition comprising the polymer of Formula (V) as defined in claim 8, and a photoacid generator.

10. A polymer represented by Formula (VI):



(VI)

wherein R_1, R_2 and R_4 are each independently hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy or phenyl; R_3 is hydrogen, C_{1-20} alkyl, C_{1-20} alkoxy, phenyl, C_{1-20} hydroxyalkyl, C_{1-20} alkoxyalkyl, C_{6-30} alicyclic hydrocarbon or C_{6-30} aliphatic lactone; X is hydrogen or hydroxyl; and n represents the degree of polymerization and is an integer from 1 to 1000.

11. A photoresist composition comprising the polymer of Formula (VI) as defined in claim 10, and a photoacid generator.

12. A method of preparing a photoresist composition, comprising:

homopolymerizing the norbornene monomer of Formula (I) as defined in claim 1, or copolymerizing the monomer of Formula (I) and maleic anhydride, to prepare a polymer; and

dissolving the polymer and a photoacid generator in a solvent.

13. A method of preparing a photoresist composition, comprising:

homopolymerizing the monomer of Formula (II) as defined in claim 2, or copolymerizing the monomer of Formula (II) and maleic anhydride, to prepare a polymer; and

dissolving the polymer and a photoacid generator in a solvent.

14. A method of preparing a photoresist composition, comprising:

mixing the monomer of Formula (II) as defined in claim 2, and an acrylate or methacrylate monomer containing an alicyclic hydrocarbon or aliphatic lactone group, to prepare a polymer; and

dissolving the polymer and a photoacid generator in a solvent.

15. The photoresist composition of claim 7, wherein the photoacid generator is added in an amount of about 0.01% to about 20% by weight, based on the weight of the polymer.

16. The photoresist composition of claim 9, wherein the photoacid generator is added in an amount of about 0.01% to about 20% by weight, based on the weight of the polymer.

17. The photoresist composition of claim 11, wherein the photoacid generator is added in an amount of about 0.01% to about 20% by weight, based on the weight of the polymer.

18. The method of claim 12, wherein the solvent is used in an amount of about 10% to about 1000% by weight, based on the weight of the polymer.

19. The method of claim 13, wherein the solvent is used in an amount of about 10% to about 1000% by weight, based on the weight of the polymer.

20. The method of claim 14, wherein the solvent is used in an amount of about 10% to about 1000% by weight, based on the weight of the polymer.

21. A method of forming photoresist patterns, comprising:

(a) applying the photoresist composition of claim 7 on a substrate, to form a photoresist film;

(b) exposing the photoresist film to light;

(c) baking the exposed photoresist film; and

(d) developing the baked photoresist film to form desired patterns.

22. A method of forming photoresist patterns, comprising:

(a) applying the photoresist composition of claim 9 on a substrate, to form a photoresist film;

(b) exposing the photoresist film to light;

(c) baking the exposed photoresist film; and

(d) developing the baked photoresist film to form desired patterns.

23. A method of forming photoresist patterns, comprising:

(a) applying the photoresist composition of claim 11 on a substrate, to form a photoresist film;

(b) exposing the photoresist film to light;

(c) baking the exposed photoresist film; and

(d) developing the baked photoresist film to form desired patterns

24. The method of claim 21, wherein the baking in (c) is carried out at about 60 °C to about 140°C.

25. The method of claim 22, wherein the baking in (c) is carried out at about 60 °C to about 140°C.

26. The method of claim 23, wherein the baking in (c) is carried out at about 60 °C to about 140°C.

27. The method of claim 21, wherein the exposing in (b) is carried out by using a far ultraviolet, an F_2 excimer laser, an extreme UV, an e-beam, an X-ray or an ion beam light source.

28. The method of claim 22, wherein the exposing in (b) is carried out by using a far ultraviolet, an F_2 excimer laser, an extreme UV, an e-beam, an X-ray or an ion beam light source.

29. The method of claim 23, wherein the exposing in (b) is carried out by using a far ultraviolet, an F_2 excimer laser, an extreme UV, an e-beam, an X-ray or an ion beam light source.

30. A semiconductor device fabricated by the method of claim 21.

31. A semiconductor device fabricated by the method of claim 22.

32. A semiconductor device fabricated by the method of claim 23.